PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Hiroshi SUMI, et al.

Docket No: Q76616

Appln. No.: 10/620,346

Group Art Unit: 1775

Confirmation No.: 8680

Examiner: Cathy Fong Fong Lam

Filed: July 17, 2003

For: COPPER PASTE, WIRING BOARD USING THE SAME, AND PRODUCTION METHOD OF WIRING BOARD

DECLARATION UNDER 37 C.F.R. § 1.132

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Kazuyuki Fujii, declare and state:

I graduated from Kyushu University, Faculty of Engineering, Department of Applied Physics, receiving a Master's Degree in March of 1999. Since April of 1999, I have been employed by NGK SPARK PLUG CO., LTD. Where I have been engaged in the development of semiconductor ceramic package materials from 1999 to 2008 and in the development of high temperature glow plugs from 2008 to the present.

I report below on comparative experimentation carried out by myself or under my direct supervision.

An additional comparative sample (called "Additional Example" in the Table below) was prepared following the procedure set forth at page 23, lines 14-20 of the substitute specification of above-identified Application No. 10/620,346, by adding 25 parts by mass of a vehicle and the

additives shown in the Table below to 100 parts by mass of a copper powder having an average particle size of 5 μm. These components were mixed using a three-roll mill to produce a copper paste. The vehicle was prepared by dissolving 30 parts by mass of polyisobutyl methacrylate and 70 parts by mass of terpineol. Wiring board samples employing the copper paste were prepared following the procedure bridging pages 27-28 of the specification. The samples thus produced were evaluated in terms of Waving Amount as described at page 28, lines 15-24 of the specification and in terms of Resistivity as set forth at page 29, lines 8-11 of the specification.

The evaluation results of the Additional Example are shown in the following Table, together with data for Examples 1-D, 2-A and 1-J reproduced from the present specification.

Table

		Particle Size of Cu	Additive (1)			Additive (2)			Waving Amount	Resistivity
			Additive	Particle Size of Additive (nm)	Amount of Additive Added (parts by mass)	Additive	Particle Size of Additive (nm)	Amount of Additive Added (parts by mass)		
Example	1-D	4.7	SiO_2	12	1.0	none	-	-	-0.01	2.5
	2-A	4.7	Al_2O_3	13	1.0	none	-	-	1.02	4.4
	1-J	4.7	SiO_2	30	1.0	none	-	-	0.02	2.5
	Additional Example	4.7	SiO_2	80	1.0	none	-	-	-0.05	4.8
									(mm)	(μΩ·cm)

As shown in the Table above, only the wiring boards of Examples 1-D and 1-J of the invention prepared using a copper paste containing an SiO_2 particle having an average particle size of 12 nm and 30 nm, respectively, within the scope of an SiO_2 particle having an average particle size of 40 nm or less provided wiring boards having both a small waving amount and low resistivity. On the other hand, Comparative Example 2-A prepared using a copper paste containing, as an additive, an Al_2O_3 particle having an average particle size of 30 nm *in place of*

the SiO_2 particle resulted in a wiring board having a substantially greater waving amount and much higher resistivity. The Additional Example, prepared using a copper paste containing an SiO_2 particle having an average particle size of 80 nm, outside the scope of an SiO_2 particle having an average particle size of 40 nm or less, provided a wiring board having a waving amount comparable to that of the samples of the invention, but suffered from much higher resistivity.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: August 29, 2008

Kazuyuki Fujii
Kazuyuki FUJII